

Remarks

In view of the above amendments and the following remarks, reconsideration of the rejection and further examination are requested.

Claims 3-6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Clarke (US 6,105,692) in view of Pickard (US 3,120,282).

Claim 3 has been amended so as to further distinguish the present invention, as recited therein, from the references relied upon in the rejection. Support for the amendment to claim 3 can be found at least in Figure 1. Further, new claim 7 has been added.

It is submitted that the above rejection is inapplicable to the present claims for the following reasons.

Claim 3 is patentable over the combination of Clarke and Pickard, since claim 3 recites a remote operation wire line core sampling device including, in part, a water swivel assembly and an over-shot assembly for grasping an upper end portion of an inner tube assembly, wherein the water swivel assembly accommodates the whole of the over-shot assembly at an intermediate position thereof between an upper water input port and a lower water input port. The combination of Clarke and Pickard fails to disclose or suggest this feature of claim 3.

Clarke discloses a drill 10 having a swivel chamber 36 with a proximal end 52 and a distal end 76. The swivel chamber 36 includes a cylindrical housing 40 and a rotary union 42. The cylindrical housing 40 has a drilling water inlet 46 and a core retrieval inlet 68. The swivel chamber 36 also includes an overshot 34 located therein. The overshot 34 includes a piston packing ring 50 and extends within an internal sleeve 48 from the distal side of the core retrieval inlet 68 past the drilling water inlet 46 and the distal end 76 of the swivel chamber 36 to a drill rod adapter 44. (See column 2, line 65 – column 3, line 25 and Figure 2)

During a drilling operation of the drill 10, the overshot 34 is positioned such that the piston packing ring 50 is located between the drilling water inlet 46 and the core retrieval inlet 68. In this position, water entering via the drilling water inlet 46 is guided toward the distal end 76 of the swivel chamber 36 by passing along an annulus 74 formed between the overshot 34 and the internal sleeve 48. (See column 3, lines 25-38 and Figure 2).

In the rejection, the core retrieval inlet 68 and the drill water inlet 46 are relied upon as corresponding to the claimed upper water input port and the claimed lower water input port, respectively. However, as clearly illustrated as dashed lines in Figure 2 of Clarke, the overshot

34 extends from between the core retrieval inlet 68 and the drill water inlet 46 towards the distal end 76 of the swivel chamber 36 and beyond to the drill rod adapter 44. Therefore, the whole of the overshot 34 is not accommodated at an intermediate position between the core retrieval inlet 68 and the drill water inlet 46. Further, due to the size of the overshot 34, it in no way could be positioned to meet this limitation.

Regarding this, for a drilling machine working on the sea-bottom, it is very important to provide a stable supply of digging water at a predetermined pressure towards a drill head, since the pressure condition at the sea-bottom (especially at a great depth) is much more severe than at ground level.

The water swivel assembly according to the present invention allows smooth passage of the digging water, since the space inside the swivel is fully open to the passage of the digging water through the lower water input port. Since there is nothing to infringe on the passage of the digging water, the possibility that a problem might occur with the stable supply of digging water at the sea-bottom is minimized.

On the other hand, the swivel of Clarke requires the digging water to pass through the annulus between the overshot and the swivel housing, which is very narrow. Since the overshot impedes passage of the digging water, there is a possibility that a problem might occur with the stable supply of digging water on the sea-bottom. In light of above, since Clarke fails to disclose or suggest this feature, Pickard must disclose or suggest it in order for the combination of Clarke and Pickard to render claim 3 obvious.

Regarding Pickard, it is relied upon in the rejection as disclosing specifics of an inner tube or core barrel. However, it is apparent that Pickard fails to disclose or suggest the above feature that is lacking from Clarke. As a result, claim 3 is patentable over the combination of Clarke and Pickard.

In addition to being patentable over the combination of Clarke and Pickard based on its dependency from claim 3, claim 4 also recites, in part, a drill head portion of having a frame slideably mounted to a mast and a mechanism for lifting the drill head portion along the frame, while a drill rod is retained in a hole, for extracting an inner tube assembly from the drill rod. The combination of Clarke and Pickard fails to disclose or suggest a drill head portion having a frame as recited in claim 4.

Clarke discloses that the drill 10 is slideably mounted to a mast 12. (See column 2, lines 47-50 and Figure 1). However, there is no disclosure or suggestion of a frame as recited in claim 4.

Regarding this, when used on the sea-bottom, a drilling machine is required to be downsized, and particularly, to have a low the center of gravity to the extent possible to maintain stability in the sea water. This means that a shorter mast is favorable. Additionally, while being transported and handled on the sea, the low the center of gravity is also desired.

The mast according to the present invention can be shortened as much as possible within the necessary minimum for digging, since the lifting mechanism is able to lift up the drill head portion with the frame slideably on the mast. While the length of the mast, to which the digging load is applied during digging, is kept to a minimum, the drill head portion can be lifted up higher than the top of the mast with the lifting mechanism.

Since Pickard also fails to disclose or suggest the frame as recited in claim 4, it is apparent that claim 4 is also patentable over the combination of Clark and Pickard based on this feature.

Because of the above-mentioned distinctions, it is believed clear that claims 3-7 are allowable over the references relied upon in the rejection. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time of invention would not have been motivated to make any combination of the references of record in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 3-7. Therefore, it is submitted that claims 3-7 are clearly allowable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that there are issues remaining which must be resolved before allowance of the application.

Respectfully submitted,

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